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Notes on *Buzura* (*Amraica*) *recursaria* (WALKER) and its Allies from Japan and Adjacent Countries, with Description of a New Subspecies (Lepidoptera: Geometridae)

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472–2, Makio, Niigata 950–21

Japanese representative of the genus *Buzura* WALKER has been treated as *recursaria* (WALKER) from India, and divided into two subspecies, *superans* (BUTLER) from the mainland and *asahinai* INOUE from the Ryukyus. I have felt some doubts as to whether the differences of the two subspecies in appearance and male genitalia are of specific or subspecific value. Recently I had an opportunity to examine some specimens of the two subspecies collected at the same time on Is. Yakushima and Is. Shimokoshiki-jima. My careful examination of many specimens of *Buzura* from Japan and adjacent areas revealed that *superans* and *asahinai* are distinct species and not conspecific with *recurusaria*, that *confusa* (STAUDINGER) from Ussuri is a subspecies of *superans*, and that Taiwanese population is worth naming as a different race of *superans*.

Buzura (*Amraica*) *recursaria* (WALKER)

(Figs. 1–2)

Boarmia recursaria WALKER, 1860: 374.
Amraica recursaria: SWINHOE, 1894: 213.
Biston (*Amraica*) *recursaria*: HAMPSON, 1895: 246.
Buzura (*Amraica*) *recursaria*: PROUT, 1915: 360.
Boarmia ferrolavata WALKER, [1862] 1863: 1536.
Boarmia solivagaria WALKER, 1866: 1586.
Amraica fortissima MOORE, 1888: 245.

Tegula and patagium reddish brown. Wings elongate, termen concave between veins M_3 and Cu_1, especially in male. Forewing grey, suffused and irrorated with fuscous and rufous; basal area and apical part of costa reddish brown; antemedial and postmedial lines black and crenulate; submarginal line white and zigzag; traces of medial line and discal spot. Hindwing similar to forewing; traces of antemedial line; discal spot smaller. Underside of wings paler, with distinct large black discal spot.

Length of forewing. ♂ 31–36 mm, ♀ 44 mm.

Male genitalia (Fig. 11). Uncus triangular, apex pointed. Gnathos developed; medial plate small, rounded at apex. Valva elongate, margins almost parallel, apex smoothly rounded; harpe long and slender, extending to about basal four-fifths of ventral margin of valva. Juxta very large, spatulate in shape. Aedeagus stout, nearly equal to the length of ventral margin of valva; many short spines on vesica.

Female genitalia (Figs. 21–22). Ovipositor very long, retractile. Sterigma with

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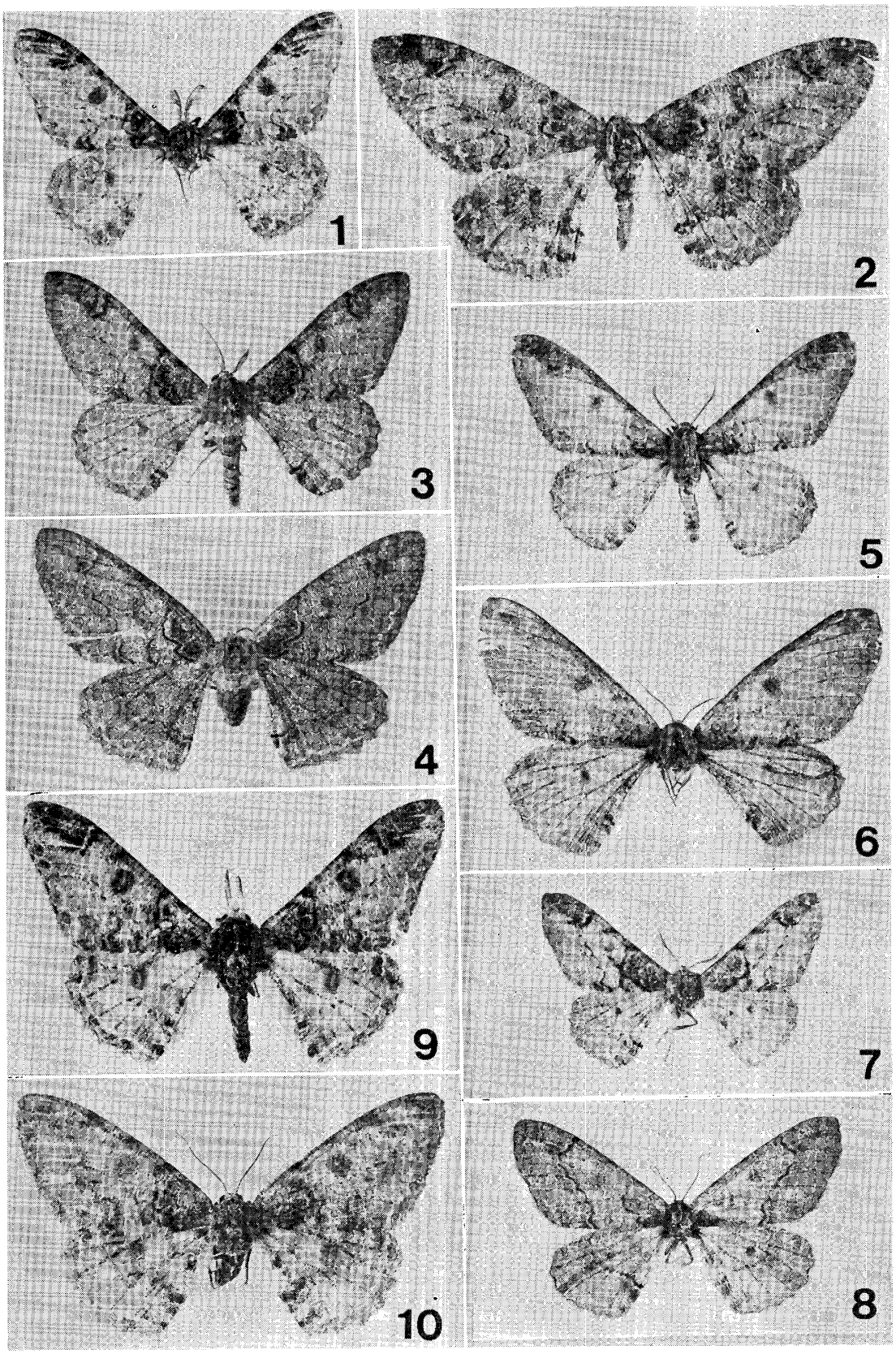

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elliptical median area, having many semicircular ridges and with broadly sclerotized lateral area. Ostium bursae strongly sclerotized, slender, about twice as long as the width at middle, deeply concave posteriorly. Ductus seminalis arising on right side posteriorly of ductus bursae. Ductus bursae long and slender. Bursa copulatrix large, bearing one stellate signum.

Material examined. 3 ♂, 1 ♀. India. 1 ♂, labelled "Khasi Hills/May 1973"; 2 ♂, labelled "Khasia Hills/ADAMS Bequest B. M. 1912–399". In coll. H. INOUE. 1 ♀, labelled "Khasia Hills, Assam, Nissary/JOICEY Bequest Brit. Mus. 1934–120". In coll. British Museum (N.H.).

Distribution. India, Burma, Java, Tonkin, New Guinea.

Remarks. PROUT (1926: 21) described *debrunnescens* from New Guinea as a subspecies of this species, which I have not yet had an opportunity to examine. The genus *Amraica* MOORE, 1888, is a monotypic genus containing *A. fortissima* MOORE, which is a junior subjective synonym of this species. It has been treated as a subgenus of *Buzura* WALKER, [1862] 1863, since PROUT (1915). *Amraica* is distinct from *Buzura* (s. str.) in the structure of male antenna as follows: unipectinate in *Amraica*, while bipectinate in *Buzura* (s. str.). It may be raised to the rank of a genus in future, but the genitalia of the two taxa must be compared for confirmation.

Buzura* (*Amraica*) *superans superans (BUTLER), stat. rev.

(Figs. 3–4)

Amphidasis superans BUTLER, 1878: 48, pl. 35: 3.
Amraica recursaria: PROUT, 1914: 264, (nec WALKER, 1860).
Buzura (*Amraica*) *superans*: PROUT, 1915: 360, pl. 24: a; WEHRLI, 1941: 435.
Biston recursaria: LEECH, 1897: 324, (nec WALKER, 1860).
Buzura recursaria superans: PROUT, 1930: 327; INOUE, 1957: 273, pl. 58: 1441, 1442; INOUE, 1959: 218, pl. 155: 1a, 1b; INOUE, 1964: 337.
Buzura (*Amraica*) *recursaria superans*: INOUE, 1956: 341; INOUE, 1977: 306.
Amraica tendinosaria v. *superans*: STAUDINGER, 1901: 337.
Buzura recursaria superans ab. *ishizukai* INOUE, 1954: 26, fig. 6, unavailable.

Similar to *recursaria*, but differing mainly as follows: forewing ampler, termen more weakly concave between veins M_3 and Cu_1; wings more strongly tinged with grey; discal spot much smaller; white zigzag submarginal line tending to be obsolete.

Length of forewing. ♂ 25–34 mm; ♀ 35–38 mm.

Male genitalia (Fig. 12). Similar to *recursaria*, but different from it as follows: valva more elongate, ventral margin gently waved; harpe shorter, extending to basal three-fifths of ventral margin of valva, apical spiniferous part larger.

Female genitalia (Fig. 20). Similar to *recursaria*, but different from it as follows: ostium bursae shorter and wider, about as long as the width at middle; ductus bursae

Figs. 1–10. *Buzura* (*Amraica*) spp. 1–2. *B.* (*A.*) *recursaria* (WALKER). 1: ♂, India. 2: ♀, India. 3–4. *B.* (*A.*) *superans superans* (BUTLER). 3: ♂, Japan, Niigata, Mt. Kakuda. 4: ♀, Japan, Kagawa, Okuno. 5–6. *B.* (*A.*) *superans taiwana* ssp. nov. 5: ♂, holotype, Taiwan, Lushan. 6: ♀, paratype, Taiwan, Lushan. 7–8. *B.* (*A.*) *superans confusa* (STAUDINGER). 7: ♂, Ussuri, Kangauz. 8: ♀, Ussuri, Kangauz. 9–10. *B.* (*A.*) *asahinai* INOUE. 9: ♂, Japan, Is. Iriomotejima, Mariudo Falls. 10: ♀, Japan, Is. Iriomotejima, Komi-Otomi.

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Material examined. 24 ♂, 7 ♀. Japan. Hokkaido — Nopporo (vii); Hakodateyama (vii). Honshu — Gunma Pref.: Namesawa (vi). Tokyo: Nippara (vi). Niigata Pref.: Niigata City (vi); Okutainai (vi); Kamikawa, Muroya (vii); Mt. Kakuda (vi); Iwamuro, Dairo-zaka (v); Muikamachi, Kimigaeri (vi); Is. Sado, Ogi (vi). Yamanashi Pref.: Akiyama (v). Wakayama Pref.: Hongû, Osugidani (viii). Okayama Pref.: Hiruzen (vii). Shikoku — Kagawa Pref.: Shionoe, Okuno (v). Kyushu — Fukuoka Pref.: Mt. Hiko-san (vi, vii). Saga Pref.: Taku (viii). Kumamoto Pref.: Tategamikyo (viii). Is. Tsushima — Mt. Ooboshiyama (vii); Mt. Koraisan (vii). Is. Shimokoshikijima — Uchinokawauchi (ix). Is. Yakushima — Shitoko (viii).

Distribution. Japan (Hokkaido, Honshu, Shikoku, Kyushu, Tsushima, Shimokoshikijima, Yakushima).

Ecological notes. The host plants recorded in the literature are as follows: *Euonymus sieboldianus*, *E. oxyphyllus*, *E. japonicus*, *E. macropterous*, *Celastrus orbiculatus* (Celastraceae) (SATO & NAKAJIMA, 1975; YAZAKI, 1977). It seems safe to conclude that this species has a definite preference for the plants of Celastraceae. Mature larva was described by KUMAKURA (1955), exclusive of microscopic structures, which will be described in my later paper. Univoltine, but probably bivoltine in warmer regions. Hibernation in pupal stage.

Remarks. This species has long been considered as the Japanese race of *recursaria*, but it is specifically separated from the latter. Besides the nominate race, the following subspecies have so far been segregated: *confusa* (STAUDINGER) from Ussuri, Manchuria and Korea, cited below; *decolorans* WEHRLI, 1941: 435, pl. 37: b, from West China; *subnigrans* WEHRLI, 1941: 435, pl. 37: a, from Central China. I have had no chance to examine the two Chinese subspecies. Taiwanese population requires a racial separation. Among the specimens of the nominate race sometimes occurs a melanic individual, named ab. *ishizukai* INOUE, which is an unavailable name according to the Code.

Buzura (Amraica) superans confusa (STAUDINGER), stat. rev.

(Figs. 7–8)

Jankowskia confusa: STAUDINGER, 1897: 47.
Amraica tendinosaria: STAUDINGER, 1901: 337 (part., nec Bremer, 1864).
Buzura (Amraica) superans confusa: PROUT, 1915: 360; WEHRLI, 1941: 435, pl. 37: a.
Buzura recursaria confusa: INOUE, 1946a: 16; INOUE, 1946b: 46; INOUE, 1964: 337; VIIDALEPP, 1979: 789.

Distinguished from the nominate subspecies by the following characters: smaller in size; wings lighter, fuscous and rufuous irroration reduced; the pattern on underside less defined.

Length of forewing. ♂ 25–28 mm, ♀ 30 mm.

Male genitalia (Fig. 13). Similar to the nominate subspecies.

Female genitalia (Fig. 18). Similar to the nominate subspecies, but posterior concavity of ostium bursae a little shallower.

Material examined. 3 ♂, 1 ♀. USSR. S-Ussuri — 1 ♂, 1 ♀, Kangauz, 26–28.

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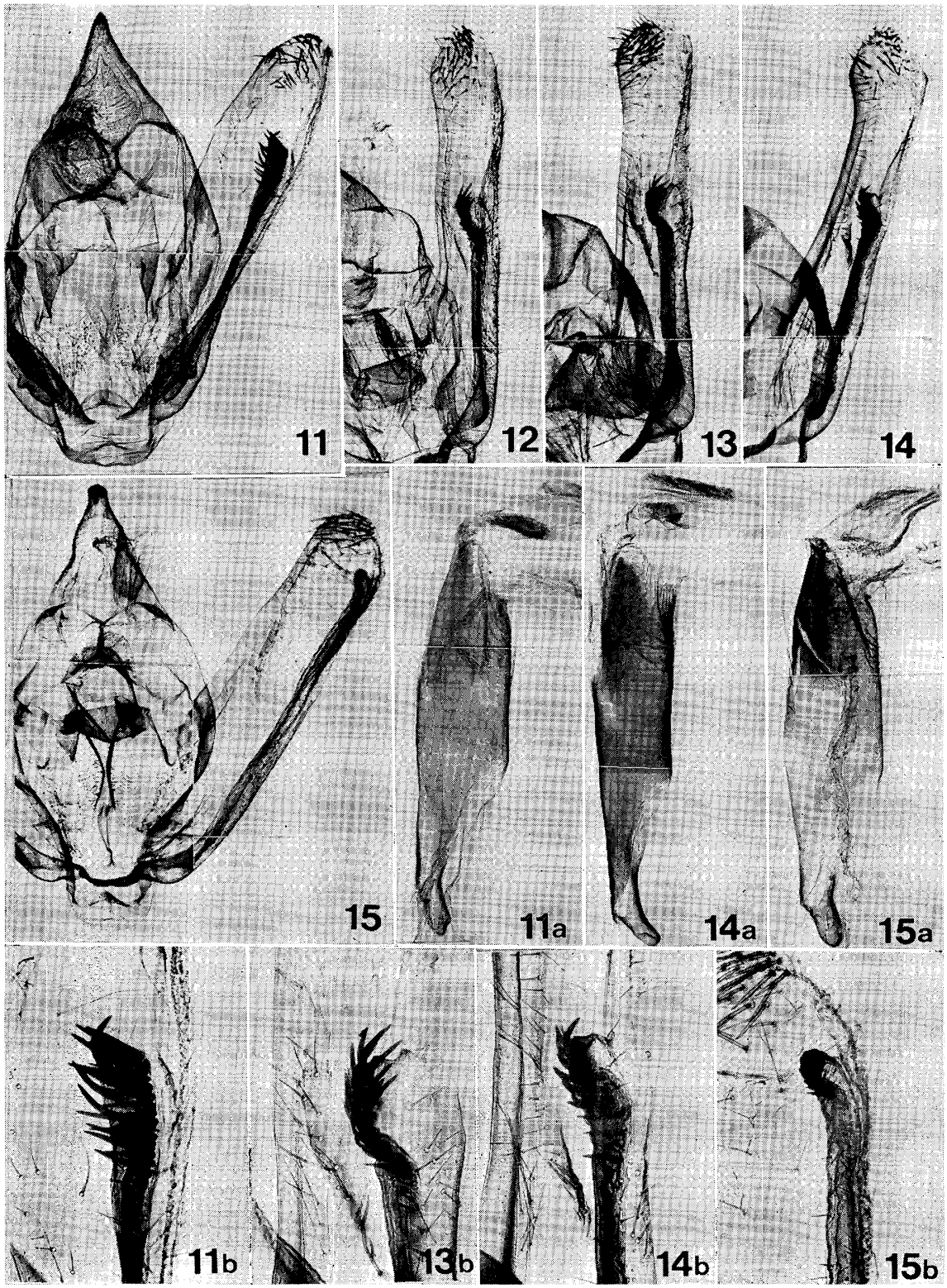

Figs. 11–15. Male genitalia of *Buzura* (*Amraica*) spp. (a) aedeagus. (b) apical part of harpe, greatly magnified. 11. *B.* (*A.*) *recursaria* (WALKER). Slide in H. INOUE. 12. *B.* (*A.*) *superans superans* (BUTLER). Slide RS-532. 13. *B.* (*A.*) *superans confusa* (STAUDINGER). RS-1293. 14. *B.* (*A.*) *superans taiwana* ssp. nov. RS-1290. 15. *B.* (*A.*) *asahinai* INOUE, RS-720.

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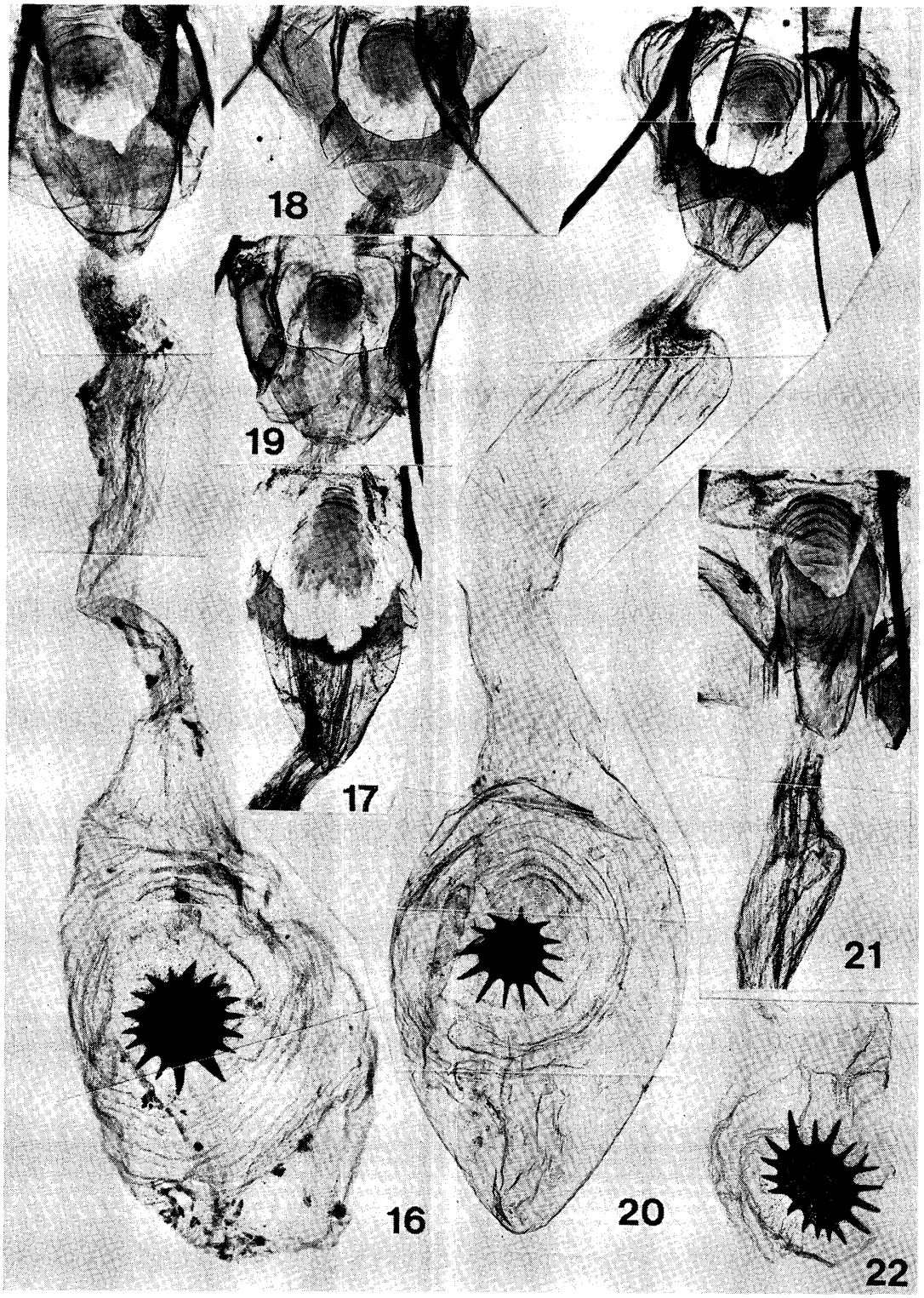

Figs. 16–22. Female genitalia of *Buzura* (*Amraica*) spp. 16. *B.* (*A.*) *asahinai* INOUE. Slide RS-1296. 17. Ditto. RS-929. 18. *B.* (*A.*) *superans confusa* (STAUDINGER). RS-1292. 19. *B.* (*A.*) *superans taiwana* ssp. nov. RS-1291. 20. *B.* (*A.*) *superans superans* (BUTLER) RS-930. 21–22. *B.* (*A.*) *recursaria* (WALKER). Slide in BMNH.

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vi. 1974 (J. VIIDALEPP). China. Manchuria — 1 ♂, Kaolingtsu Station, 26–28. 1940 (collector unknown). Korea. 1 ♂, Kyongsang Punkto, Kimchon, 4. vi. 1976 (collector unknown). The last two males in coll. H. INOUE.

Distribution. Ussuri, China (Manchuria), Korea.

Buzura (Amraica) superans taiwana subsp. nov.

(Figs. 5–6)

Easily separable from the nominate subspecies as follows: tegula and patagium grey, not tinged with reddish brown; wings with fuscous suffusion and irroration much reduced, showing much paler appearance; postmedial and submarginal lines less defined; forewing with basal part and apical marking very weakly tinged with reddish brown.

Length of forewing. ♂ 28–37 mm, ♀ 39 mm.

Male genitalia (Fig. 14). Similar to the nominate subspecies.

Female genitalia (Fig. 19). Similar to the nominate subspecies, but posterior concavity of ostium bursae much shallower and signum larger.

Holotype. ♂, Taiwan, Nantou, Lushan, 29–30. iv. 1973 (M. YAMAMOTO). Paratypes. Taiwan. Nantou Hsien — 1 ♂, 1 ♀, same data as holotype; 2 ♂, Lushan, 19–21. iii. 1972 (K. NAKATOMI); 8 ♂, Wushe, 1965; 1 ♀, Wushe, 1964; 1 ♂, Puli, summer, 1963; 1 ♂, Puli, 1968; 1 ♂, 1968 (ex. H. KEZUKA). "Central Formasa", 1 ♂, 1959. The specimens from Wushe, Puli and "Central Formosa" were secured by unknown native collectors.

Holotype is preserved in the collection of the National Science Museum (Nat. Hist.), Tokyo. Paratypes are deposited in the same museum and partly in Dr. H. INOUE's collection and my private collection.

Buzura (Amraica) asahinai INOUE, stat. nov.

(Figs. 9–10)

Buzura recursaria asahinai INOUE, 1964: 337, pl. 8: 4; INOUE, 1977: 306.

In appearance more similar to *recursaria* than to *superans*, differing from *recursaria* mainly as follows: wings more strongly suffused and irrorated with rufuous; lines and markings more developed.

Length of forewing. ♂ 28–35 mm, ♀ 37–44 mm.

Male genitalia (Fig. 15). Similar to *recursaria*, but different from it as follows: harpe longer and slender, extending near the apex of ventral margin of valva, apical part smaller with much shorter spines.

Female genitalia (Figs. 16–17). Similar to *recursaria*, but different from it as follows: ostium bursae longer and wider, about 1.5 times as long as the width at middle, more deeply concave posteriorly.

Material examined. 81 ♂, 3 ♀. Japan. Is. Shimokoshikijima — Uchinokawa-uchi (ix). Is. Yakushima — Shitoko (iii, viii); Nagata (viii); Suzukawa (viii). Is. Amamiôshima — Mt. Yuwandake (viii); Mt. Yuidake (viii); Kominato (iii); Hatsuno (iii, viii). Okinawa — Gogayama (viii); Seifuautaki (viii); Mt. Yonahadake (viii);

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Mt. Yaedake (viii); Ginama (viii). Is. Ishigakijima — Mt. Bannadake (iii). Is. Iriomotejima — Urauchibashi (iii); Mariudo Falls (iii); Kampira Falls (iii); Yamagoya near Kampira Falls (iii); Komi-Otomi (iii); Komi (iii); Oohara (iii).

Distribution. Shimokoshikijima, Yakushima, Amamiôshima, Okinawa, Kumejima, Miyakojima, Ishigakijima, Iriomotejima.

Ecological notes. Larva and food plants unknown. Probably bivoltine.

Remarks. INOUE (1964) considered that *superans* is the Japanese mainland subspecies of *recursaria* and described *asahinai* as the Ryukyuan subspecies. However, my close examination shows that *asahinai* is a distinct species from both *recursaria* and *superans*. This species is easily distinguished from *superans* by the following characters: wings more elongate, termen of forewing strongly concave, especially in male; upperside of wings darker in colour, more strongly suffused and irrorated with fuscous and rufuous; lines and markings more developed; discal spots much larger. *B. superans* and *asahinai* were collected sympatrically on Is. Yakushima and Is. Shimokoshikijima as follows: Is. Yakushima, Shitoko, 2–4. viii. 1972 (*superans* 1 ♂, *asahinai* 6 ♂) (Y. FUJIMAKI); Is. Shimokoshikijima, Uchinokawauchi, 6. ix. 1975 (*superans* 2 ♂, *asahinai* 1 ♂) (K. YOSHIDA), in coll. Laboratory of Entomology, Tokyo University of Agriculture. This fact sustains that *asahinai* is not a subspecies of *superans* but a distinct species. I examined one melanic specimen (♂) collected at Shitoko, Is. Yakushima on 2–4 August 1972.

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摘　　要

わが国のウスイロオオエダシャクは従来インドの *Buzura* (*Amraica*) *recursaria* (WALKER) と同一種とされ，本土の個体群は subsp. *superans*，屋久島以南の琉球の個体群は subsp. *asahinai* として扱われてきた．最近下甑島（鹿児島県）と屋久島において，それぞれ同一地点で同時に採集された両“亜種”の標本を見出したことから再検討した結果，共に独立種として扱うべきであり，さらにそれらは *recursaria* とも異なる種であることが判明した．またウスリー・朝鮮の *confusa* は，*superans* の亜種であり，台湾の *Buzura* は *superans* であるが色彩斑紋に明らかな差があることから別亜種として扱うべきこともわかった．なお亜属 *Amraica* は，♂触角が片櫛歯状という顕著な特徴をそなえており，将来属に昇格される可能性があるが，狭義の *Buzura* と交尾器などの比較検討をおこなっていないので本報では従来の取扱いに従った．

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Buzura (*Amraica*) *recursaria* (WALKER).

インド，ビルマ，ジャワ，トンキン，ニューギニア.

B. (*A.*) *superans superans* (BUTLER) ウスイロオオエダシャク.

日本（北海道，本州，四国，九州，対馬，下甑島，屋久島).

B. (*A.*) *superans confusa* (STAUDINGER) ウスリー，満州，朝鮮.

B. (*A.*) *superans taiwana* SATO 台湾.

B. (*A.*) *asahinai* INOUE アサヒナオオエダシャク（新称).

日本（下甑島，屋久島，奄美大島，沖縄，久米島，宮古島，石垣島，西表島).

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